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Crangon miocenicus (Garassino & Teruzzi, 1996) from the Lower Miocene of N Caucasus (Russia) (Crustacea, Decapoda)

Riassunto – *Crangon miocenicus* (Garassino & Teruzzi, 1996) del Miocene inferiore del N Caucaso (Russia) (Crustacea, Decapoda).

I crostacei decapodi macruri della Regione di Apsheronsk (N Caucaso, Russia) sono stati oggetto di studio da parte di Garassino & Teruzzi (1996). Il campione esaminato, limitato a soli cinque esemplari, venne attribuito dagli autori ai due nuovi generi *Longitergite* (infraordine Penaeidea de Haan, 1849, famiglia Penaeidae Rafinesque, 1815) e *Bannikovia* (infraordine Caridea Dana, 1852, famiglia indeterminata), rispettivamente con *L. miocenicus* n.sp. e *B. maikopensis* n.sp.. La mancanza di alcuni caratteri morfologici, quali ad esempio le appendici toraciche, e la scarsa conservazione di alcune parti anatomiche, quali il carapace o l'addome, hanno inficiato una approfondita analisi di entrambe le specie, limitata ad una descrizione sommaria. Recentemente, il rinvenimento di un abbondante campione, proveniente dalla stessa località, ha permesso di individuare caratteri morfologici precedentemente sconosciuti che mettono in dubbio la reale validità sistematica dei due generi. Abbiamo infatti potuto stabilire che l'esemplare appartenente a *Longitergite* Garassino & Teruzzi, 1996 è riconducibile per le appendici cefaliche particolarmente sviluppate, per la sovrapposizione della pleura del somite II rispettivamente su quelle dei somiti I e III, per il pereiopode I subchelato e per il somite VI fortemente allungato agli esemplari di *Bannikovia* Garassino & Teruzzi, 1996, mentre gli esemplari di *Bannikovia* Garassino & Teruzzi, 1996 sono da ascriversi per alcuni caratteri morfologici, quali la presenza di carene sul carapace, il pereiopode I subchelato e i pereiopodi II-V a dactylus terminale al genere vivente *Crangon* Fabricius, 1798 (infraordine Caridea Dana, 1852, famiglia Crangonidae Haworth, 1825). Il rinvenimento di questo genere riveste una particolare importanza in quanto trattasi della prima segnalazione della famiglia Crangonidae Haworth, 1825 nel record fossile.

Parole chiave: Crustacea, Decapoda, Brachyura, Miocene inferiore, Russia.

Abstract – The macruran decapod crustaceans of the Apsheronsk Region (N Caucasus, Russia) were studied by Garassino & Teruzzi (1996). The study sample (five specimens) was ascribed by the authors to the new genera *Longitergite* (infraorder Penaeidea de Haan, 1849, family Penaeidae Rafinesque, 1815) and *Bannikovia* (infraorder Caridea Dana, 1852, indeterminate family), with *L. miocenicus* and *B. maikopensis* respectively. The lack of some morphological features, such as for instance the thoracic appendages, and the poor preservation of some anatomical parts, such as the carapace and the abdomen, did not allow a detailed morphological analysis of both species. Therefore only a brief description was provided. Recently, the discovery of a rich sample, from the same locality, permitted identification of some previously unknown morphological features that

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raise doubt about the systematic validity of the two genera. In fact, both genera are representatives of the same genus and, provided with the new morphological details, *Longitergite* and *Bannikovia* should be referred to the genus *Crangon* Fabricius, 1798 (infraoder Caridea Dana, 1852, family Crangonidae Haworth, 1825) for some morphological features, such as the presence of carinae along the dorsal surface of carapace, the subchelate pereiopod I, and pereiopods II-V with terminal dactylus. The discovery of this genus is particularly important because it is the first report of the family Crangonidae Haworth, 1825 in the fossil record.

Key words: Crustacea, Decapoda, Brachyura, Lower Miocene, Russia.

Introduction

Garassino & Teruzzi (1996) described five complete and incomplete specimens of macruran decapod crustaceans, discovered during an excavation carried out in the nineties by Dr. A. Bannikov of the Palaeontological Museum of the Academy of Sciences of the CSI in the Apsheronsk Region (N Caucasus, Russia), 1.5 km West of Shirvaskaya, near the Pshekha river. The specimens are preserved in the upper layers of the Maikop Series dated as middle-upper Oligocene and Lower Miocene (Nalivkin, 1973).

The specimens were referred to the new genera *Longitergite* (infraorder Penaeidea de Haan, 1849, family Penaeidae Rafinesque, 1815) and *Bannikovia* (infraorder Caridea Dana, 1852, indeterminate family) with *L. miocenicus* n.sp. and *B. maikopensis* n.sp. respectively.

The recent discovery of a rich sample (26 complete and incomplete specimens) in the Lower Miocene layers of Maikop Series, raises a doubt about the real systematic validity of the two genera.

Garassino & Teruzzi (1996) described the new genus *Longitergite* Garassino & Teruzzi, 1996 on the basis of some morphological features, such as the short rostrum, the well developed cephalic appendages, and the elongate somite VI. The good state of preservation of the new sample revealed that some specimens, ascribable to *Longitergite* Garassino & Teruzzi, 1996, showed not only the above mentioned features, but also two important features not observed by Garassino & Teruzzi (1996): the rounded pleura of somite II partially overlapping those of somite I and III and the subchelate pereiopod I. These features are typically of the infraorder Caridea Dana, 1852 and not of the infraorder Penaeidea de Haan, 1849. Therefore, these observations lead us to consider *Longitergite* Garassino & Teruzzi, 1996 as synonymous of *Bannikovia* Garassino & Teruzzi, 1996.

Moreover, *Bannikovia* Garassino & Teruzzi, 1996 shows some morphological features, such as the well developed cephalic appendages, the presence of carinae on the carapace, the subchelate pereiopod I, and pereiopod II-V with terminal dactylus, that are typical of the living genus *Crangon* Fabricius, 1798 (family Crangonidae Haworth, 1825) (Holthuis, 1993; Falciai & Minervini, 1992).

The rich sample allowed recognition of some morphological features previously not described thus permitting a more complete description of *C. miocenicus* (Garassino & Teruzzi, 1996) with its reconstruction.

Systematics

Infraorder Caridea Dana, 1852
Family Crangonidae Haworth, 1825
Genus *Crangon* Fabricius, 1798

Crangon miocenicus (Garassino & Teruzzi, 1996)
Figs. 1, 2, 3

1996 – *Longitergite miocenicus* Garassino & Teruzzi; Garassino & Teruzzi, p. 6, Fig. 1
1996 – *Bannikovia maikopensis* Garassino & Teruzzi; Garassino & Teruzzi, p. 7, Figs. 2, 3, 4, 5, 6

Diagnosis: subrectangular carapace with row of denticulate carinae; short rostrum lacking supra- and subrostral teeth; somite II with subround pleura partly covering the pleurae of somites I and III; somite VI strongly elongate; pereiopod I subchelate; pereiopods II-V with terminal dactylus; exopodite of the uropods without diaeresis.

Holotype of *Bannikovia*: PIN 4504-1.

Holotype of *Longitergite*: PIN 4505-5a.

Paratypes of *Bannikovia*: PIN 4504-3, PIN 4505-4a.

Type locality: Apsheronsk Region (N Caucasus).

Geological age: Upper Maikop beds (Lower Miocene).

Material: 26 specimens in a good state of preservation. We add to this sample the other five specimens, previously studied by Garassino & Teruzzi (1996).

Description. Elongate caridean, with thin and smooth exoskeleton, 2 to 5 cm in length.

Carapace. The carapace, in lateral view in almost all specimens, has a subrectangular shape and narrows slightly toward the anterior margin for the small curvature of the ventral margin. The dorsal margin is slightly bent, while the posterior margin has a sinuous trend with a small convexity in the lower third. The dorsal margin extends into a short rostrum, with pointed distal extremity, lacking supra- and subrostral teeth. One thin denticulate carina extends parallel in the upper third of the carapace, near the dorsal margin.

Abdomen. Somite II bears a subround pleura partly overlapping the pleurae of somite I and III. The posterior margin of somite III is straight, while that of somites IV-V is posteriorly projecting, thus forming a slight convexity in the lower third. Somite VI has a rectangular shape and it is strongly elongate. The telson, as long as somite VI, has a triangular shape and a pointed distal extremity. The uropods have the same length as the telson. The outer margin of the exopodite bears a small spine at the distal extremity and there is no diaeresis.

Cephalic appendages. The eye is supported by a short eye stalk. The antennulae comprise of three short articula, while the articula of the antennae are thin and elongate. The spatula-shaped scaphocerite has a little spine by the distal extremity of the outer margin.

Thoracic appendages. Pereiopod I is subchelate with an elongate propodus that bears a small spine at the distal extremity of the outer margin. Pereiopods II-V have a terminal dactylus.

Abdominal appendages. The pleopods are not preserved in any specimen.

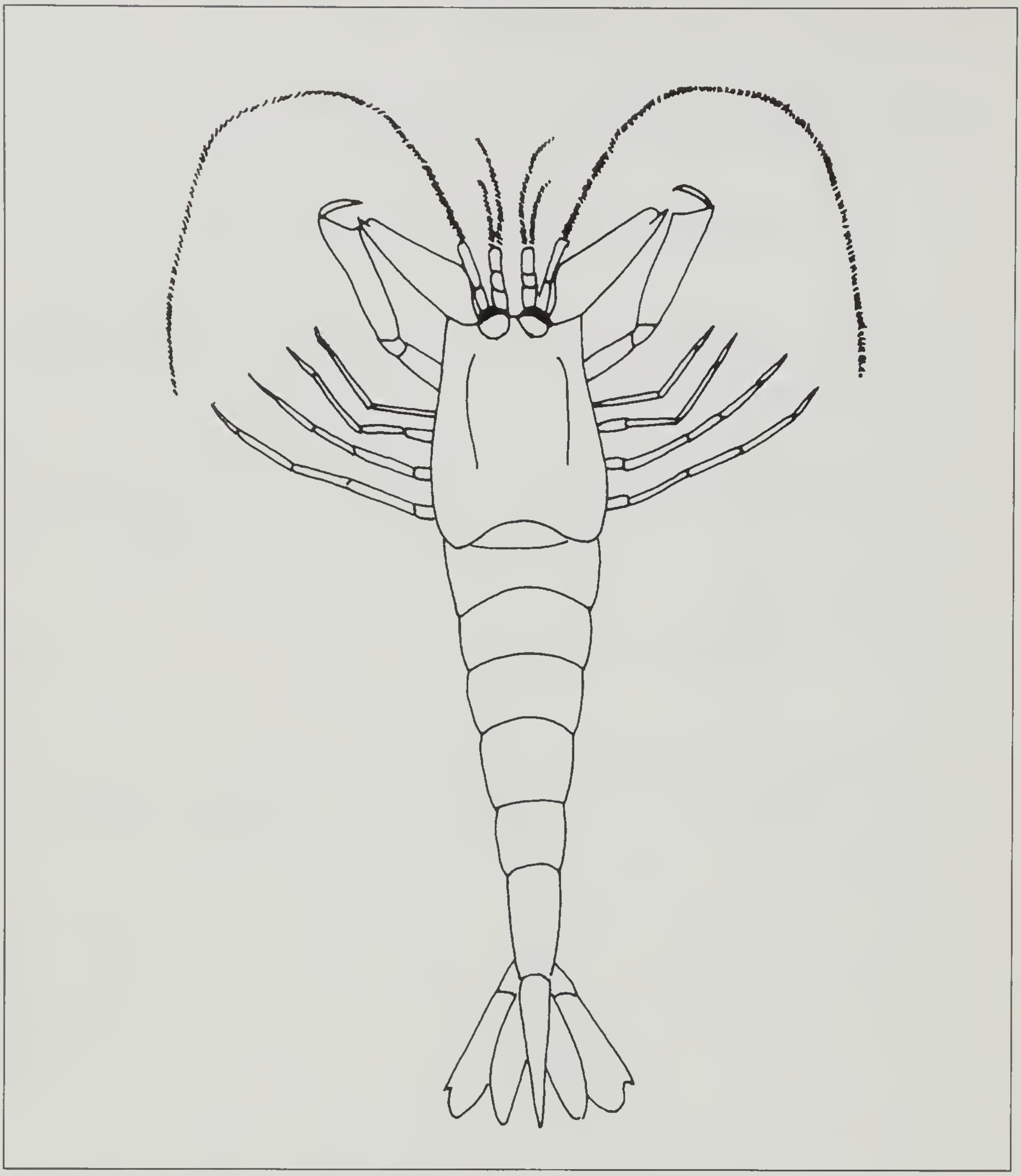

Fig. 1 – *Crangon miocenicus* (Garassino & Teruzzi, 1996), reconstruction.
Fig. 1 – *Crangon miocenicus* (Garassino & Teruzzi, 1996), ricostruzione.

Observations

Carideans are very rare in the fossil record and their morphological features are not well known because of the poor state of preservation.

The most ancient genera known to date, *Acanthinopus* Pinna, 1974 and *Leiothorax* Pinna, 1974 (both indeterminate families), were discovered in the Zorzino Limestone (Norian, Upper Triassic) of Bergamo Prealps (Cene, Seriana Valley – Bergamo, N Italy) (Pinna, 1974). Another form, *Pinnacaris* Garassino & Teruzzi, 1993 (indeterminate family), was described in the Riva di Solto

Shales (Sevatian, Upper Norian – Lower Rhaetian, Upper Triassic – depending upon the authors) of Ponte Giurino (Imagna Valley – Bergamo, N Italy) (Garassino & Teruzzi, 1993).

Glaessner (1969) ascribed to the Jurassic only *Udorella* Oppel, 1862 (family Udorellidae Van Straelen, 1924). The same author ascribed also three *incertae sedis* Jurassic genera to carideans: *Blaculla* Münster, 1839, *Hefriga* Münster, 1839 and *Udora* Münster, 1839.

We presently recognize seven genera of Cretaceous carideans.

Martins-Neto & Mezzalira (1991a) found a few specimens of carideans in the Crato Member of Santana Formation (Lower Cretaceous) of Brazil. The perfect state of preservation of these specimens allowed the authors to describe *Beurlenia* (family Palaemonidae Rafinesque, 1815), *B. araripensis*.

Roger (1946) described *Notostomus cretaceus* Roger in a sample of five specimens discovered in the Santonian (Upper Cretaceous) of Sahel Alma (Lebanon). This species was subject of a review by Garassino (1994), who assigned Roger's species to the new genus *Odontochelion* (family Oplophoridae Dana, 1852).

Rabadà (1993) described the new genus *Delclosia, D. martinelli* Rabadà in a sample of 60 specimens of the Lower Barremian (Lower Cretaceous) of Las Hoyas (Cuenca, Spain). This genus was the object of review by Garassino (1997).

Bravi & Garassino (1997a, b) described the new genera *Parvocaris, P. samnitica* Bravi & Garassino (indeterminate family) on a sample of 14 specimens from the Lower Albian (Lower Cretaceous) of Pietraroia (Benevento, Southern Italy) and *Alburnia, A. petinensis* Bravi & Garassino (family Palaemonidae Rafinesque, 1815) on a sample of 3 specimens of the Middle Albian (Lower Cretaceous) of Petina (Salerno, Southern Italy).

Garassino (1998) described 3 specimens from the Barremian-Aptian (Lower Cretaceous) of the Valley of the Cornappo River (Udine, NE Italy) the new genus *Tonellocaris, T. brevirostrata* Garassino (family Oplophoridae Dana, 1852.

Recently, Bravi *et alii* (1999) described 93 complete and fragmentary specimens, discovered in the Upper Cretaceous of Vesole Mount (Salerno, Southern Italy), of the genus *Palaemon* Weber, 1795, *P. vesolensis* Bravi *et alii* (family Palaemonidae Rafinesque, 1815).

Only three genera of carideans are presently known in Tertiary deposits.

Four species belong to *Bechleja* Houša, 1956, a typical form of freshwater deposits: *B. rostrata* Feldmann *et alii*, 1981, from the Eocene of the Green River Formation (Wyoming, United States); *B. inopinata* Houša, 1956 from the Oligocene of Czech Republic; *B. bahiaensis* (Beurlen, 1950) and *B. robusta* Martins-Neto & Mezzalira, 1991 from the Oligocene of Brazil (Beurlen, 1950; Houša, 1956; Feldmann *et alii*, 1980; Martins-Neto & Mezzalira, 1991b).

In the Miocene deposits of N Caucasus (Russia) *Palaemon* Weber, 1795 and *Pasiphea* Savigny, 1816 were described with *P. mortuus* Smirnov, 1929 and *P. mortua* Smirnov, 1929 (Smirnov, 1929) respectively.

The discovery of *Crangon* Fabricius, 1798, in the Lower Miocene layers of the Maikop Series is important because it is the first report of this genus in the fossil record. The presence of *Crangon* Fabricius, 1798, a decapod crustacean living at present in deep-water, tropical regions, in the Miocene layers of N Caucasus would confirm the hypothesis of a deep-water origin of the Maikop

Series, as claimed by Nalivkin (1973). This origin has been further confirmed by the discovery in the Maikop Series of a rich brachyuran decapod assemblage in which Garassino & Novati (2000) have described new species of the genera *Liocarcinus* Leach, 1814 and *Platymaia* Miers, 1886, the last of which is a typical abyssal benthonic form, living the warm seas of Indo-Pacific and western Atlantic (Guinot & Richer de Forges, 1985).

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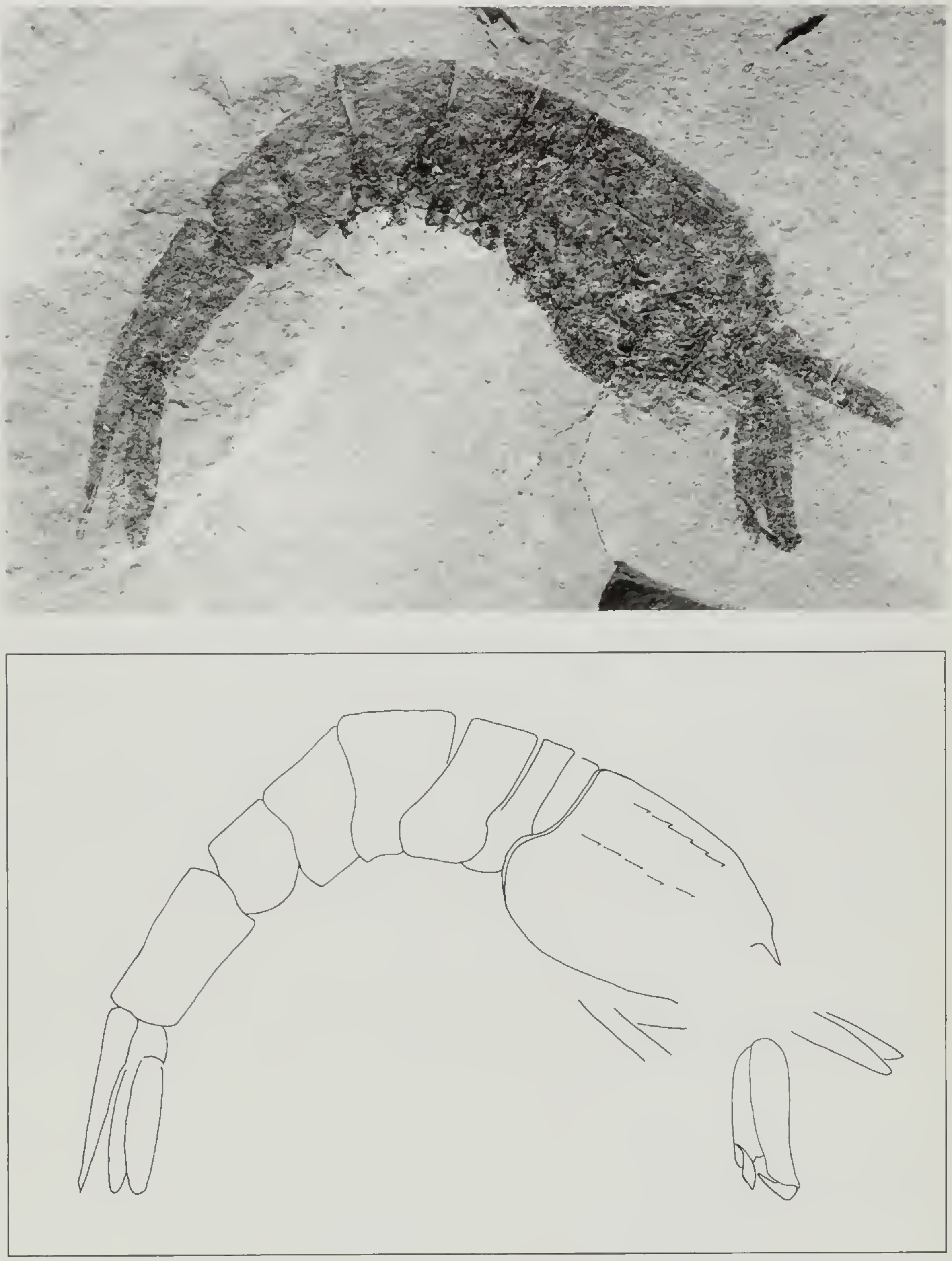

Fig. 2 – *Crangon miocenicus* (Garassino & Teruzzi, 1996), n.cat. MSNM i22946, photo and reconstruction (x 2).
Fig. 2 – *Crangon miocenicus* (Garassino & Teruzzi, 1996), n.cat. MSNM i22946, fotografia e ricostruzione (x 2).

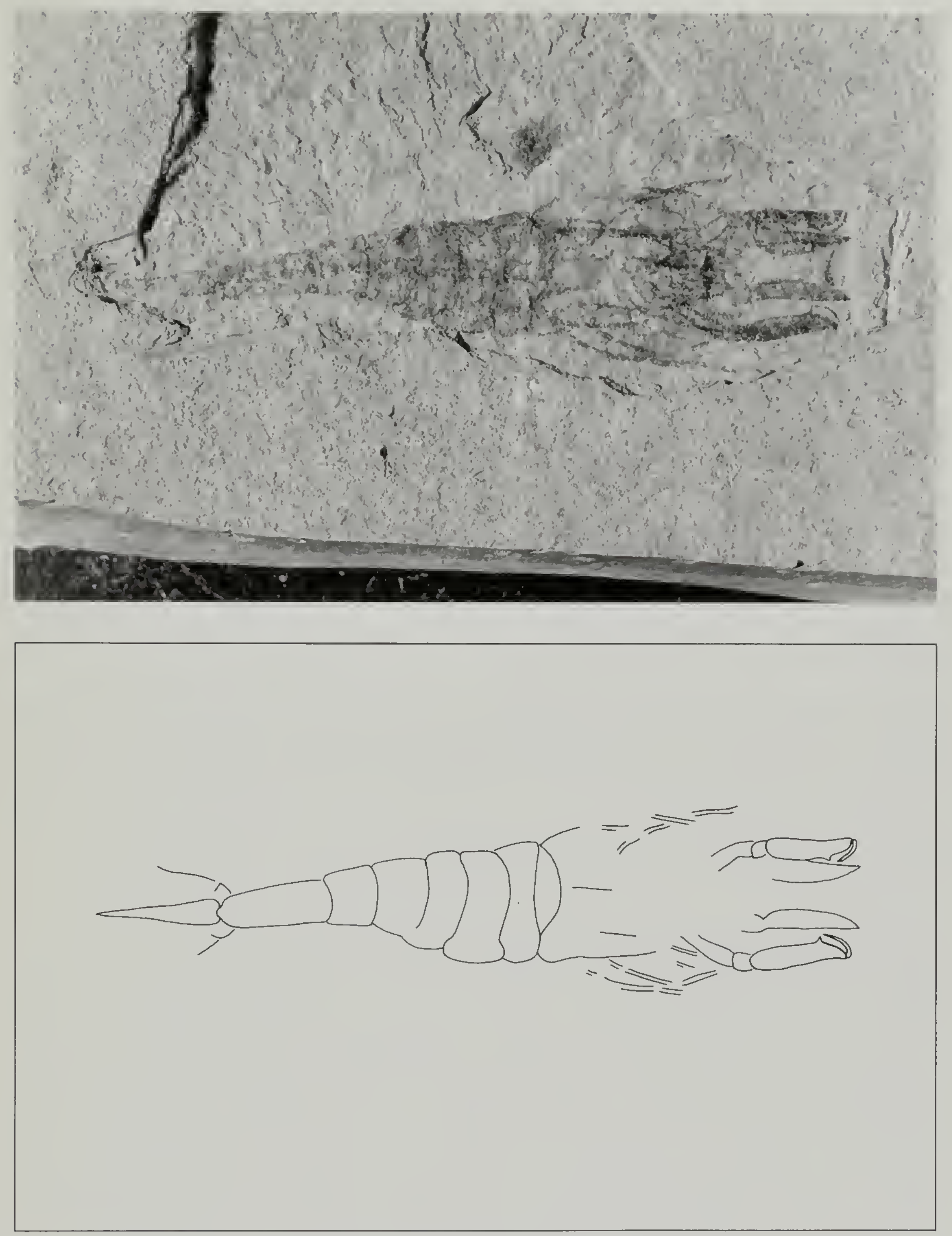

Fig. 3 – *Crangon miocenicus* (Garassino & Teruzzi, 1996), n.cat. MSNM i22947, photo and reconstruction (x 2).

Fig. 3 – *Crangon miocenicus* (Garassino & Teruzzi, 1996), n.cat. MSNM i22947, fotografia e ricostruzione (x 2).